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Status and distribution of vultures in Andhra Pradesh, India

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Gyps vultures in the Indian subcontinent and South-East Asia have declined catastrophically during the last decade, and current populations are estimated to be <5% of the original (Prakash *et al.* 2003). The major reason for these declines appears to be the use of the veterinary drug diclofenac for treating cattle (Oaks *et al.* 2004, Prakash *et al.* 2005, Swan *et al.* 2006). Conservation efforts in India have included research and captive breeding programs (Prakash *et al.* 2003, Umapathy *et al.* 2005, MoEF 2006). Most detailed studies have taken place in northern India, where vultures occurred at their highest densities in the past; less information is available from southern India. The southern Indian state of Andhra Pradesh has six species of vultures: White-backed Vulture *Gyps bengalensis*, Long-billed Vulture *G. indicus*, Indian Griffon Vulture *G. fulvus*, Egyptian Vulture *Neophron percnopterus*, King Vulture *Sarcogyps calvus* and Cinereous Vulture *Aegypius monachus* (Ali and Ripley 1983). An informal survey between 1990 and 1997 counted approximately 8,500 vultures across the state (Srinivasulu and Srinivasulu 1999). In the present study, we provide updated information on the status and distribution of vultures in Andhra Pradesh.

METHODS

We surveyed vultures across Andhra Pradesh, including all major cities, the 19 Wildlife Sanctuaries, the four National Parks, Srisailem Tiger Reserve and important reserve forests, between January and December 2007 (Table 1), using the road-transect survey method (Fuller and Mosher 1981) between 08h00 and 17h00. Road transects were run at 20–30 km/h; where roads were absent (mainly forests, but also remote villages and open land) transects were walked at c.3km/h. Detectability may have been higher along foot transects, but we did not attempt to quantify this. Road transects were mostly on state highways and on roads running through protected areas. No transects were repeated, and adjoining transects were separated by at least 30 km. Vultures were recorded within 300 m of a transect using 10x binoculars. Encounter rates of vultures were calculated as the number of individuals sighted per km of transect.

In addition to running transects, we also visited 54 municipal, town, and village dump yards, looking for carcasses and vultures. Information on these dump yards was collected from local government offices. At least two hours in the morning (between 08h00 and 11h00 hrs) were spent searching dump yards and, whenever animal carcasses were found, a second visit was made the next day. In general, we attempted to visit sites where vultures had previously been reported. During the survey, we gave questionnaires to officers of the Forest Department (the government department responsible for wildlife conservation) as well as local wildlife biologists and naturalists. The questions focused recent vulture sightings and the availability of carcasses.

RESULTS

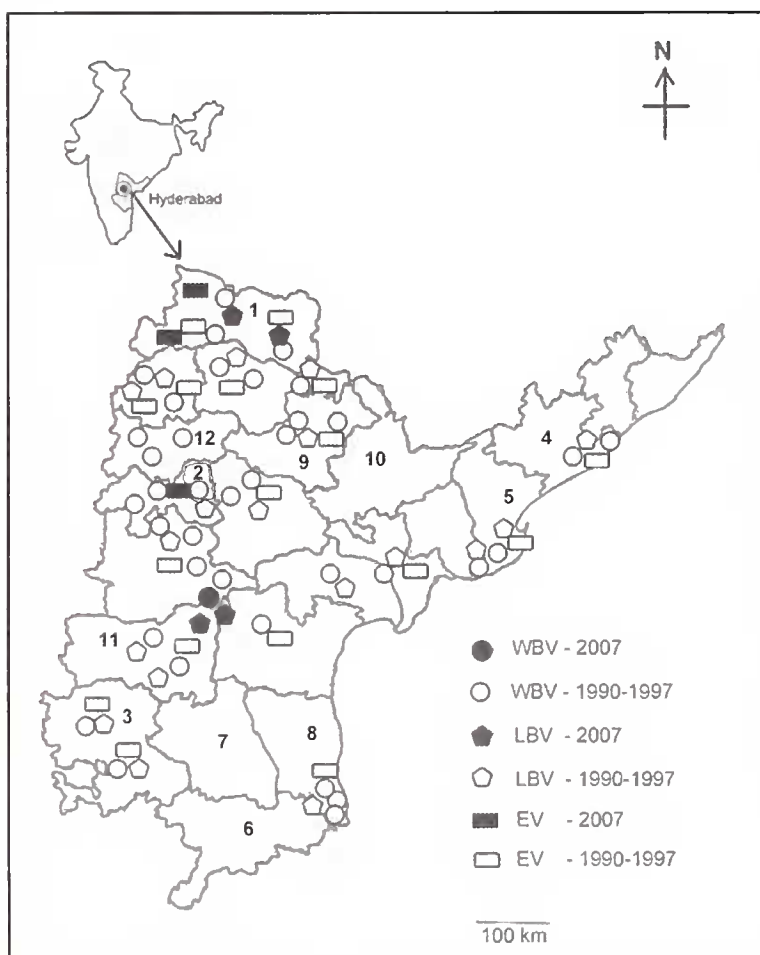
In total, we covered 4,670 km across 129 separate transects, which varied in length from 3 to 160 km. Of this total, road transects accounted for 4,070 km and foot transects for 603 km. In all, we saw 20 individual vultures of three species (Table 2 and Fig. 1). The two *Gyps* vultures sighted were found exclusively in forests, while the third species, Egyptian Vulture, was seen only at municipal

Table 1. Total transect length, protected areas (sanctuaries, national parks, and tiger reserve) surveyed and number of dump yards visited.

District	Total distance covered (km)	No. of protected areas surveyed	No. of dump yards visited
1. Adilabad	741	3	10
2. Hyderabad	218	2	4
3. Anantapur	209	—	3
4. Visakapatnam	174	1	2
5. Kakinada	162	1	3
6. Chittoor	387	2	3
7. Kadapa	182	2	3
8. Nellore	138	2	3
9. Warangal	411	2	4
10. Khammam	181	1	8
11. Kurnool	1,593	2	6
12. Medak	274	2	5

Table 2. Details of vulture sightings during the survey.

Species	Date of sighting	Number of individuals	Location	District or Protected area	Coordinates
Long-billed Vulture	2 April 2007	4	Mattadiguda, Utnoor	Adilabad	19°22'02"N 78°47'28"E
Long-billed Vulture	6 April 2007	3	Dharmaraopet, Bellampally	Adilabad	19°03'17"N 79°29'24"E
Long-billed Vulture	3 March 2007	1	Tummalabayilu, Markapur	Srisaillam Tiger reserve	15°58'48"N 79°06'59"E
Long-billed Vulture	26 September 2007	5	Sundipenta, Kurnool	Srisaillam Tiger reserve	16°05'70"N 78°91'30"E
White-backed Vulture	30 March 2007	1	Domalpenta	Srisaillam Tiger reserve	16°10'70"N 78°90'47"E
Egyptian Vulture	18 January 2007	1	Dump yard next to Mahaveer Harina Vanasthali National Park	Hyderabad	17°21'06"N 78°34'56"E
Egyptian Vulture	27 January 2007	1	Dump yard next to Mahaveer Harina Vanasthali National Park	Hyderabad	17°21'06"N 78°34'56"E
Egyptian Vulture	3 February 2007	3	Dump yard next to Mahaveer Harina Vanasthali National Park	Hyderabad	17°26'52"N 79°34'56"E
Egyptian Vulture	31 March 2007	1	Mavala Lake	Adilabad	19°37'49"N 78°30'28"E

**Figure 1.** Sightings of White-backed (WBV), Long-billed (LBV) and Egyptian Vultures (EV) in Andhra Pradesh, India in 1990–1997 (from Srinivasulu and Srinivasulu 1999) and in 2007. District numbers are given in Table 1.

dump yards. On transects, 13 Long-billed Vultures were seen (encounter rate 0.003 individuals per km) and one White-backed Vulture was seen (encounter rate 0.0002).

During the survey, we found 11 fresh animal carcasses (all of cattle), eight of which were on the outskirts of villages, two beside the road, and one in forest. Of the 54 dump yards visited, only 18 were active, and were used for dumping slaughterhouse waste: bones of cattle, chicken waste and so on. Five of the six Egyptian Vultures seen were at a single dump yard in Hyderabad city. (Note that,

because these were seen on different visits, the actual number of individuals may have been less than five.) Vultures were not seen at the other dump yards, but other scavenging birds were sighted, including Black Eagle *Ictinaetus malayensis*, Crested Serpent Eagle *Spilornis cheela*, Short-toed Snake Eagle *Circaetus gallicus* and Black Kite *Milvus migrans*. In the questionnaire survey, 22% (of 80) respondents had seen vultures at least once in the previous five years and 4% had sighted vultures on carcasses during the last five years. Most respondents (78%) said that they had not seen any abandoned carcasses in the previous five years.

DISCUSSION

We found very few vultures compared with similar studies in northern India. For example, Prakash *et al.* (2003) surveyed northern, eastern and western India, and calculated encounter rates of 0.14 and 0.08 individuals/km for White-backed and Long-billed Vultures respectively. Encounter rates from our study show that vulture abundance in Andhra Pradesh is many times lower than these estimates.

Information collected during this survey clearly shows a catastrophic decline of vultures in Andhra Pradesh, just as has been documented in northern India (Prakash *et al.* 2003, 2007). A collation of sightings from 1990 to 1997 in Andhra Pradesh totalled 8,615 individual White-backed, Long-billed, Egyptian and King Vultures, from 120 sightings at 39 sites in 15 districts (Srinivasulu and Srinivasulu 1999). This earlier study found that the number of individuals per sighting was relatively large, ranging from 4.6 (King Vulture) to 38.1 (White-backed Vulture). In contrast, we found only 20 vultures, and in very small groups (Table 2). A strict comparison between the earlier study and our own is not possible, because no formal sampling method was used by Srinivasulu and Srinivasulu (1999). Nonetheless, the differences in the number of vultures seen, and in group size, are striking.

Further, although we found White-backed and Long-billed Vultures exclusively in or near forests, Srinivasulu and Srinivasulu (1999) found them mostly near villages

and towns. It is possible that one of the reasons for this change in distribution is a reduction in the number of carcasses being abandoned. Personal observations suggest that, rather than dumping them, cattle-owners in Andhra Pradesh are increasingly selling sick cattle to slaughterhouses, or burying dead cattle after skinning them. This may explain the large number of inactive dump yards (36 of 54) that we found as well as the high proportion of respondents who reported not having seen an animal carcass in the previous five years. These pieces of information, together with our observations of *Gyps* vultures only in forested areas suggest that a decline in food availability could be an additional factor in hastening the decline of vultures in Andhra Pradesh, as has been proposed for northern Indian populations (Prakash *et al.* 2003).

Our results show that at least two wild populations of Long-billed Vulture (at Srisailem Tiger Reserve and Adilabad) and one population of White-backed Vulture (at Srisailem Tiger Reserve) exist in Andhra Pradesh. We suggest urgent implementation of steps to monitor population sizes and reproduction of vultures at these sites. In addition, monitoring diclofenac in cattle and enforcing the ban on its use are crucial. Maintaining feeding facilities ('vulture restaurants'), where diclofenac-free carcasses are provided regularly is a conservation action that may provide immediate respite to the vulture populations in these areas.

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